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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/562,319	12/23/2005	Yoshinobu Watanabe	10873.1837USWO	5814
53148 7590 08/09/2007 HAMRE, SCHUMANN, MUELLER & LARSON P.C. P.O. BOX 2902-0902 MINNEAPOLIS, MN 55402			EXAMINER BOR, HELENE CATHERINE	
			ART UNIT 3768	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/562,319	Applicant(s) WATANABE ET AL.	
	Examiner Helene Bor	Art Unit 3768	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 December 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>12/23/2005</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Acknowledgement of Preliminary Amendments

1. For the record, acknowledgement is made of the applicant's preliminary amendments to the specification and the claims under 37 CFR 1.115. The applicant amended the specification and claims, 3, 5, 6, 8 11, 14-20. Under examination are the original and newly amended claims, 1-20.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 103. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claim 1-3 & 5-20 are rejected under 35 U.S.C. 102(e) as being anticipated by

Seizer'187 et al (US Patent No. 7,074,187 B2).

Claim 1: Seizer'187 teaches an ultrasonic diagnostic apparatus, comprising a

transmission unit that transmits at least one ultrasonic pulse from a skin surface of a subject toward a blood vessel thereof (Col. 8, Line 43-48 & Figure 5, Element 40 & 42).

Seizer'187 teaches an ultrasonic diagnostic apparatus, comprising a reception unit that receives an ultrasonic echo reflected by the blood vessel and converts the same into an electric signal to obtain a signal of the ultrasonic echo along a depth direction from the skin surface (Col. 8, Line 43-48, Col. 6, Line 47-51 & Figure 5, Element 40 & 42).

Seizer'187 teaches an ultrasonic diagnostic apparatus, comprising a movement detection unit that analyzes a phase of the ultrasonic echo signal in a direction traversing the blood vessel so as to calculate a movement amount in each of a plurality of parts included in a blood vessel wall constituting the blood vessel and a vicinity of the blood vessel wall (Col. 9, Line 30-48 & Col. 10, Line 36-43). Seizer'187 teaches an ultrasonic diagnostic apparatus, comprising a boundary detection unit that detects a boundary position between the blood vessel wall and a blood flow region in a lumen of the blood vessel through which blood flows based on a variation in the calculated movement amount in each part (Figure 10, Col. 6, Line 47-51 & Col. 10, Line 36-43).

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Claim 2/1: Seizer'187 teaches the ultrasonic diagnostic apparatus, further comprising a ROI placement unit [tracking portion] that sets placement of a ROI where the boundary position along the depth direction from the skin surface is to be detected by the boundary detection unit (Figure 10 & Col. 17, Line 15-23). Seizer'187 teaches the ultrasonic diagnostic apparatus, wherein the ROI placement unit places the ROI so as to lie over at least one of an anterior wall of the blood vessel wall on a side closer to the transmission unit and a posterior wall of the blood vessel wall on a side farther from the transmission unit (Col. 10, Line 36-53).

Claim 3/1: Seizer'187 teaches the ultrasonic diagnostic apparatus, wherein the transmission unit transmits a plurality of ultrasonic pulses toward a plurality of parts along a longitudinal direction of the blood vessel (Col. 9, Line 19-29 & Figure 5, Element 40 & 42). Seizer'187 teaches the boundary position detection unit detects the boundary position for each of the plurality of parts along the longitudinal direction of the blood vessel (Figure 10).

Claim 5/3/1: Seizer'187 teaches the ultrasonic diagnostic apparatus, further comprising a display unit that displays an image of the blood vessel in cross section along the longitudinal direction of the blood vessel based on the boundary position along the longitudinal direction of the blood vessel that is detected by the boundary position detection unit (Figure 5, Element 10, Figure 3A, Col. 9, Line 19-29 & Col. 12, Line 38-43).

Claim 6/1: Seizer'187 teaches the ultrasonic diagnostic apparatus, further comprising an average processing unit that performs average processing of data representing the

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boundary position that is detected by the boundary position detection unit based on data representing a boundary position obtained a predetermined number or more of measurement cycles before (Col. 16, Line 13 – Col. 17, Line 10).

Claim 7/6/1: Seizer'187 teaches the ultrasonic diagnostic apparatus, wherein the measurement cycles include a heartbeat cycle of a blood flow that flows through the blood vessel (Col. 16, Line 63 – Col. 17, Line 10).

Claim 8/1: Seizer'187 teaches the ultrasonic diagnostic apparatus, further comprising an average processing unit that performs average processing of data representing the movement amount of the blood vessel wall that is detected by the movement detection unit based on data representing a movement amount obtained a predetermined number or more of measurement cycles before (Col. 16, Line 13-28).

Claim 9: Seizer'187 teaches an ultrasonic diagnostic apparatus comprising a transmission unit that transmits at least one ultrasonic pulse from a skin surface of a subject toward a blood vessel thereof (Col. 8, Line 43-48 & Figure 5, Element 40 & 42). Seizer'187 teaches the ultrasonic diagnostic apparatus a reception unit that receives an ultrasonic echo reflected by the blood vessel and converts the same into an electric signal to obtain a signal of the ultrasonic echo along a depth direction from the skin surface (Col. 8, Line 43-48, Col. 6, Line 47-51 & Figure 5, Element 40 & 42). Seizer'187 teaches the ultrasonic diagnostic apparatus a movement detection unit that analyzes a phase of the ultrasonic echo signal in a direction traversing the blood vessel so as to calculate a movement amount in each of a plurality of parts included in a blood vessel wall constituting the blood vessel and a vicinity of the blood vessel wall (Col. 9, Line 30-

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48 & Col. 10, Line 36-43). Seizer'187 teaches the ultrasonic diagnostic apparatus a boundary detection unit that detects a boundary position between an inner membrane of the blood vessel and a blood flow region in a lumen of the blood vessel through which blood flows and a position of a middle membrane of the blood vessel based on a variation in the calculated movement amount in each part (Figure 10, Col. 6, Line 47-51 & Col. 10, Line 36-43).

Claim 10/9: Seizer'187 teaches the ultrasonic diagnostic apparatus, further comprising a ROI placement unit that sets placement of a ROI where the boundary position between the inner membrane of the blood vessel and the blood flow region and the position of the middle membrane are to be detected along the depth direction from the skin surface by the boundary detection unit (Figure 10, Col. 17, Line 15-23 & Claim 10). Seizer'187 teaches the ultrasonic diagnostic apparatus wherein the ROI placement unit places the ROI so as to lie over at least one of an anterior wall of the blood vessel wall on a side closer to the transmission unit and a posterior wall of the blood vessel wall on a side farther from the transmission unit (Figure 10, Col. 19, Line 12-25, & Claim 9 & 10).

Claim 11/9: Seizer'187 teaches the ultrasonic diagnostic apparatus, further comprising a calculation unit that measures a thickness from the inner membrane to the middle membrane based on the boundary position and the position of the middle membrane (Claim 9 & 10, Figure 5, Element 48 & Col. 17, Line 2-10).

Claim 12/11/9: Seizer'187 teaches the ultrasonic diagnostic apparatus, wherein the calculation unit measures the thickness from the inner membrane to the middle

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membrane based on a variation over time in the boundary position and a variation over time in the position of the middle membrane in one heartbeat cycle (Claim 9 & 10, Figure 5, Element 48 & Col. 17, Line 2-10).

Claim 13/12/11/9: Seizer'187 teaches the ultrasonic diagnostic apparatus, wherein the calculation unit calculates at least one of a maximum value, a minimum value and an average value of the thickness in one heartbeat cycle (Figure 5, Element 48 & Col. 16, Line 38-63).

Claim 14/11/9: Seizer'187 teaches the ultrasonic diagnostic apparatus, wherein the transmission unit transmits the plurality of the ultrasonic pulses toward the plurality of parts along the longitudinal direction of the blood vessel, and the calculation unit measures the thickness at each of the plurality of parts (Col. 8, Line 43-48, Figure 5, Element 40 & 42, Claim 9 & 10, Figure 5, Element 48 & Col. 17, Line 2-10).

Claim 15/11/9: Seizer'187 teaches the ultrasonic diagnostic apparatus, further comprising a display unit that displays a part where a maximum thickness is measured among the thicknesses measured at the plurality of parts (Figure 5, Element 48 & Col. 6, Line 51-56).

Claim 16/9: Seizer'187 teaches the ultrasonic diagnostic apparatus, further comprising an angle correction unit that performs angle correction with respect to a value of the thickness corresponding to an angle formed between a measuring direction of the thickness calculated by the calculation unit and a direction perpendicular to the blood vessel wall (Col. 4, Line 24-45).

Claim 17/9: Seizer'187 teaches the ultrasonic diagnostic apparatus, further comprising

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a stability determination unit that determines stability of the thickness calculated by the calculation unit by comparing the thickness calculated by the calculation unit with a thickness obtained a predetermined number or more of cycles before (Col. 15, Line 45 – Col. 16, Line 3).

Claim 18/9: Seizer'187 teaches the ultrasonic diagnostic apparatus, wherein the transmission unit transmits a plurality of the ultrasonic pulses toward a plurality of parts along a longitudinal direction of the blood vessel, the calculation unit measures the thickness at each of the plurality of parts (Col. 8, Line 43-48 & Figure 5, Element 40 & 42). Seizer'187 teaches the ultrasonic diagnostic apparatus further comprises a stability determination unit that determines stability of the thickness calculated by the calculation unit by comparing the thicknesses measured at the plurality of parts with each other (Col. 15, Line 45 – Col. 16, Line 3).

Claim 19/11: Seizer'187 teaches the ultrasonic diagnostic apparatus, further comprising a unit that displays a value of the thickness calculated by the calculation unit on a monitor (Figure 5, Element 48 & Col. 6, Line 51-56).

Claim 20/9: Seizer'187 teaches the ultrasonic diagnostic apparatus, further comprising a unit that displays the boundary position and the position of the middle membrane detected by the boundary detection unit on a monitor (Figure 5, Element 48 & Col. 6, Line 51-56 & 62-67).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claim 4- re rejected under 35 U.S.C. 103(a) as being unpatentable over

Seizer'187 et al (US Patent No. 7,074,187 B2) and further in view of Li'756 (US Patent Application No. 2003/0114756 A1).

Claim 4/3/1: Seizer'187 teaches the ultrasonic diagnostic apparatus, for processing of data representing the boundary position along the longitudinal direction of the blood vessel that is detected by the boundary position detection unit (Col. 8, Line 43-48, Figure 5, Element 40 & 42, Figure 10, Col. 6, Line 47-51 & Col. 10, Line 36-43).

Seizer'187 fails to teach the filter. However, Li'756 teaches a filter processing unit [wall filter] (Page 2, Para 21-23). It would have been obvious to one of ordinary skill in the art to combine the teachings of Seizer'187 and Li'756 in order to remove motion artifacts (Page 3, Para 23).

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. Palti, Yoram. Method and apparatus for detecting arterial stenosis, 10/17/2002. US 20020151795 A1.
- b. Mo; Larry Y. L. et al. Ultrasound B-mode and doppler flow imaging, 09/17/2002. US 6450959 B1.
- c. Mine; Yoshitaka. Method of ultrasound imaging and diagnostic ultrasound system, 05/13/1997. US 5628322 A.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Helene Bor whose telephone number is 571-272-2947. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eleni Mantis-Mercader can be reached on 571-272-4740. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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